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ABSTRACT

Of the nine long range goals of adapted physical education, creative thinking and moving has received the least attention. However, this goal may be more important than others in helping handicapped children self-actualize through sports, dance, and aquatics. This paper defines behaviors in the creative process and describes several assessment approaches, including: (1) Torrance Tests of Creative Thinking; (2) Wyrick Test of Motor Creativity; (3) Torrance Tests of Thinking Creatively in Action and Movement; (4) TWU Motor Creativity Rating Scale; and (5) Brennan Test of Creative Motor Performance. Also reviewed is current literature on such topics as games analysis intervention theory, shared decision making in physical education, teacher behaviors which optimize student-teacher interactions, and modeling of creative behaviors. A 39 citation reference list on motor creativity is included. (Author/CB)

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Fostering Creativity in Handicapped Children

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Fostering Creativity in Handicapped Children

The purpose of adapted physical education is to change psychomotor behaviors (i.e., to ameliorate or correct specific problems that interfere with success and/or movement satisfaction in integrated physical education and recreation). In some cases this involves improvement in sports, dance, aquatics, movement education, and/or basic motor, fitness, and leisure skills. In other cases, especially in working with physically disabled or sensory-impaired students, change is directed toward teaching alternative physical activities in which students can succeed. Illustrative of these are wheelchair sports and dance, beep baseball and goal ball for blind students, and games and movement activities in which rules, boundaries, and equipment are changed to assure optimal success and satisfaction in clumsy or uncoordinated individuals.

Nine long-range goals of adapted physical education have been identified (Sherrill, 1986) as a means of changing psychomotor behaviors. These goals entail ameliorating or correcting problems in the following broad areas: self-concept and body image, motor skills and patterns, physical and motor fitness, creative

thinking and movement, fun/tension release, play and game skills, social competency, leisure time habits, and sensory integration/ perceptual motor function. Based on assessment of the present level of psychomotor function of a child, the adapted physical educator typically selects three or four of these goal areas and develops specific short-term objectives to be achieved during a specific period of time.

Of these nine goals, creativity has received the least attention from both educators and researchers. Yet the very essence of adapted physical education is creativity (i.e., adapting teaching progressions and activities so that clumsy and/or handicapped children can succeed and experience satisfaction in movement). Moreover, it is not sufficient for teachers to be creative. Students with mental, behavioral, or psychomotor problems need problem solving skills more than their nondisabled peers. Individuals who are different need skills for adapting to a world which may be hostile, indifferent, or simply inconvenient. Work productivity, independent living, mental health, and self-actualization in such individuals depend largely upon personal creativity. The purpose of this paper is

to increase awareness of creativity as a goal of physical education, to describe assessment techniques, and to suggest instructional approaches for developing creativity in the movement setting.

Behaviors in the Creative Process

Behaviors in the creative process are presented in Table 1 (Sherrill, 1979; 1986). Like intelligence, creativity is multidimensional. Creativity also spans all three educational domains: cognitive, affective, and psychomotor. Table 1 presents only the behaviors in the cognitive and affective domains because research on motor creativity and handicapped children is sparce (Jay, in progress; Jackson-Glass & Reid, 1981; Lubin & Sherrill, 1977, 1980; Reber & Sherrill, 1981; Rowe, 1976; Sherrill & Rowe, 1975; Sherrill, Lubin, & Routon, 1977, 1979).

Among the many sources in which theories of creativity are reviewed are books by Arieti (1976) and Taylor and Getzels (1975). Although it is beyond the scope of this paper to discuss creativity theory, it is important to consider definitions. Many definitions of creativity, like that of Torrance (1974), are similar to

explanations of research. Torrance states, for example, that creativity is...

> A process of being sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty: searching for solutions, making guesses, or formulating hypotheses about the deficiencies: testing and retesting them; and finally communicating the results. (Torrance, 1974, p. 8)

Yet, we know that research (i.e., problem solving) is not always creative. MacKinnon (1975) defines creativity in terms of the conditions it fulfills.

> It [creativity] involves a response or an idea that is novel or at the very least, statistically infrequent. But novelty or originality, while a necessary aspect of creativity, is not sufficient if a response is to lay claim to being part of the creative process; it must also to some extent be adaptive to reality. It must serve to solve a problem, fit a situation, or accomplish some recognizable goal. And thirdly, creativeness involves a sustaining of the original insight, an

> evaluation and elaboration of it, a developing of it to the full. (MacKinnon, 1975, pp. 68-69)

MacKinnon (1975) summarizes creativity as "a process that is extended in time and characterized by originality, adaptiveness, and realization" (p. 68).

Creativity is closely related to self-actualization as conceptualized by Maslow (1962). Characteristics of the self-actualized person described by Maslow include creativeness, spontaneity and naturalness/freshness, acceptance of self and others, problem-centered rather than self-centered, autonomy/independence of culture and environment, sense of humor, peak experiences/feelings of wonder and awe, and high concentration ability. These are characteristics important to success in sports, dance, and aquatics as well as life in general.

Creativity and Handicapped Children

Little research has been conducted on handicapped children's potential for creativity; existing studies have been reviewed by Sherrill (1979) and Ford and Ford (1981). Whereas handicapped children are generally found inferior to their normal peers on verbal measures of creativity, often no significant difference is found

between the handicapped and the normal on nonverbal measures. Movement thus seems an ideal means for facilitating creative development.

Assessment of Creative Thinking

Several tests that measure creativity have been validated, but the ones used most often in education are by E. Paul Torrance (1975). The Torrance Tests of Creative Thinking (TTCT) are standardized for use in kindergarten through graduate school. They include Thinking Creatively With Pictures, which yields separate scores for fluency, flexibility, originality, and elaboration, and Thinking Creatively With Words, which yields separate scores for fluency, flexibility, and originality. Both can be ordered from Scholastic Testing Service, Inc., 480 Meyer Rd., Bensenville, IL 60106.

Each test includes several subtests. The best known of the pictorial tests is probably the circles task in which each person is given a page containing 40 circles, each of which is about the size of a quarter. The task is to create as many different objects or pictures out of these circles as possible in 10 minutes. The test is scored, not only for number of different objects, but for

originality or uniqueness of drawings. The best known of the verbal tests is to take a word with multiple meanings (like head or ball) and think of as many uses as possible. Head, for instance, can refer to a body part, the foam on beer, the position one holds in class, the bathroom, the boss or supervisor, and several other things.

Assessment of Motor Creativity

In order for motor creativity to be considered a viable goal of adapted physical education, teachers must be aware of tests that can be used for measurement of change. Among these are the Wyrick Test of Motor Creativity (Wyrick, 1968), the Torrance Test of Thinking Creatively in Action and Movement (Torrance, 1976, 1981), the TWU Motor Creativity Rating Scale (Sherrill, Lubin, & Routon, 1979), and the Brennan Test of Creative Motor Performance (Brennan, 1983).

The Wyrick Test of Motor Creativity consists of three test forms, each measuring a different aspect of motor creativity: (a) Form O, for motor originality; (b) Form F, for motor fluency, and (c) Form M-C, for combined

motor originality and fluency. Illustrative test items are the following:

1. How many ways can you travel back and forth between two parallel lines? Each way must incorporate a twist or turn in it.
2. How many ways can you move from one end of a low beam to another? In each way, some part of the body--excluding arms, hands, feet, or legs--must touch the beam. Any other part of the body may touch the beam in as many different ways as you wish.
3. How many ways can you move an 8-inch playground ball, by striking or hitting only, to a wall? You must stay behind a restraining line drawn 8 feet from the wall.

Scoring is different for motor fluency and motor originality. The motor fluency score is the sum of the responses of the student on each item. The motor originality score is derived by asigning 2, 1, or 0 points to each response according to its frequency of occurrence among all the students being tested. Responses that occur only once among all the students are considered unique or original and assigned 2 points.

Responses made by two students are considered semi-original and assigned 1 point. Responses that occur three or more times within the group receive 0 points.

The Torrance Test of Thinking Creatively in Action and Movement, standardized for children ages 3 to 7, measures imagination as well as fluency and originality. This test consists of four items.

The imagination item requires children to pretend they are six different things: a tree in the wind, a rabbit, a fish, a snake, a person driving a car, and a person trying to push an elephant. The child's response to each "Can you move like?" is scored on a 5-point scale as follows:

1 point -- child does not move

2 points -- action is inadequate

3 points -- action is adequate but without interpretation

4 points -- action shows imagination

5 points -- actions tell a story beyond the assigned role

The other three items are scored both for fluency and originality. Item 1 asks how many ways can you move from one place to another. Item 3 asks how many ways you

can put a paper cup in a waste basket. Item 4 asks how many different things you can do with a paper cup (i.e., imagine it is something else and show its use). Fluency, like in the Wyrick Test, is scored as the frequency of responses. Originality is scored as 3, 2, 1, or 0 points in a method similar to that used by Wyrick except that comparisons do not have to be made among children. Instead, a test manual lists all possible responses and indicates the points to be awarded for each. Illustrative of this system is the following for how many different things can you do with a paper cup.

0 points	for hat, pencil, or jumping cup	Response made by 10% or more of normative group
1 point	for spider, worm, and pop game	Response made by 5-9% of normative group
2 points	for telescope, shoe cover, and nose cover	Response made by 2-4% of normative group
3 points	for baseball bat, cow's milk, and dog's bowl	Response made by 2% or less of normative group

Among others, the Torrance Test has been used by Bonatis (in progress), Jackson-Glass and Reid (1981), Jay (in progress), and Lubin and Sherrill (1980).

The TWU Motor Creativity Rating Scale (MCRS) was designed to measure motor creativity in free play, movement education, and dance improvisation. The MCRS (see Figure 1) is comprised of basic questions under the subheadings of originality, fluency, flexibility, and elaboration.

With young children and with mentally retarded persons, play, solution of movement problems, and dance improvisation seem to be more creative in relation to props (scarves, beanbags, balloons, large rag dolls) or novel playground equipment (Lind Climber, Trestle Tree Apparatus) than the body alone. The MCRS can be used in any setting, with or without equipment and/or props depending upon the student's needs. Sherrill and Lubin (1977), for instance, used the MCRS with the London Trestle Tree Apparatus. The challenge to each child was "You can play on anything you want to. Go play". In this study 20 preschoolers, ages 3 to 4 years, were videotaped individually in 5-minute segments on 2 consecutive days: Examination of test-retest reliability

of 13 raters (all graduate students) and of interrater objectivity indicated that training in observation and assessment of motor creativity is needed before the average teacher can use the MCRS. With no training, the test-retest reliability for the 13 raters was .62. The interrater objectivity coefficient for the 13 untrained raters was .49. Bonatis (in progress) reports the test-retest reliability for two raters of 7 children on the Lind Climber as ranging from .82 to .97. The MCRS is still in the pilot testing stage. Its content validity is derived from the careful evolution of its questions from explanations of originality, fluency, flexibility, and elaboration by authorities (Taylor & Getzels, 1975; Torrance, 1976). Criterion-rated validity is currently under study by Bonatis.

The Brennan Test of Creative Motor Performance (Brennan, 1983), also in the pilot testing stage, has been used so far only with dance majors. The test seems applicable, however, to handicapped children and youth. In this test motor fluency is scored by the same procedure used by Wyrick (1968), Torrance (1976), and Sherrill and Lubin (1977). Originality in relation to dynamics (use of movement speed, duration, and force) and

space (range of joint action, body or body part direction, interrelationship of body parts, level, and visual design) is rated on a 7-point scale (1 = usual, to 7 = highly unusual). The mean of two ratings (one on composition and one on improvisation) serves as the student's originality score. Flexibility is rated also on a 7-point scale (1 = similar, to 7 = highly different); this rating is derived by observing the degree to which dynamics and space are used differently in two composition test trials.

The Brennan Test includes four items: (a) Positions Test, scored only for fluency; (b) Improvisation Test, scored only for originality, (c) Composition Test 1, scored only for originality, and (d) Composition Test 2, scored for both originality and flexibility. Test performance is videotaped, and scoring is done by one or two trained observers who view the videotapes. The Positions Test challenges the student to assume as many imaginative body positions as possible within 1 1/2 minutes. The Improvisation Test challenges the student to imaginatively improvise movement for 1 1/2 minutes while one foot is kept in contact with a chosen spot on the floor. Composition Tests 1 and 2 both use four

body positions which the teacher demonstrates. In test 1 the student is challenged to compose an imaginative movement sequence in which the four body positions occur in the same order as in the demonstration. In test 2, the student again uses the four body positions in creating an imaginative movement sequence but this time the positions may occur in any order. The challenge is to make the second composition as different from the first as possible.

Development of Creativity

Research is available that documents the effectiveness of long-term creativity training programs on the development of verbal and figural creativity (Rose & Lin, 1984), but almost no experimental research on motor creativity has been published. Moreover, some instructional approaches that enhance motor creativity have not been described under titles that include the key word creativity and hence are not easily accessed in computer searches. Among these are studies of teaching behaviors and styles and games analysis intervention.

Most experimental research studies on motor creativity of handicapped children are attempts to

examine the efficacy of either movement education or dance programs. Experimental research documenting that movement education approaches can improve creativity in mentally handicapped children is limited to studies by Carter, Richmond, and Bundschuh (1973), Sherrill and Rowe (1975), Rowe (1976), and Crumbliss and Wenger (1978). Changes in motor creativity of deaf preschoolers as a result of movement education are reported by Lubin (Curtis-Pierce) and Sherrill, 1980. Creative dance is the intervention program described by Reber and Sherrill (1981) as effective in increasing figural creativity and dance skills of hearing impaired adolescents. Proponents of movement education and dance give much lip service to the advantages of such programs. Nevertheless, rigorously conducted scientific studies are greatly needed in this area. Following are brief reviews of other approaches which also require scientific study.

Games Analysis Intervention and Creativity

Games analysis intervention theory (Marlowe, 1980a,b; Morris, 1976, 1980) forms the basis of much adapted physical education pedagogy. This is the theory underlying the adaptation of games to meet the individual

needs of students and/or to ameliorate or correct specific problems that interfere with game success and movement satisfaction. Although many methods and materials books discuss ways of changing games, physical educators often approach this task haphazardly rather than relying upon and extending theory.

G.S. Don Morris, currently a physical education professor at California State Polytechnic University in Pomona, appears to be the pioneer in formulating games analysis intervention theory. His classic book, How to Change the Games Children Play (1976, 1980) presents a model for the manipulation of game components within six categories (players, equipment, movement pattern, organizational pattern, limitations/rules, and purpose). Use of this model provides a systematic approach to helping both teachers and students become more creative.

The model can be used in altering an established game or in creating a new game. Both change and creation begin with the ability to conceptualize many possibilities within each category. If a regulation game is to changed, the first procedure is to analyze its components and develop a grid. Following is an illustrative grid for regulation softball.

Players	Equipment	Movements	Organ. Pattern	Limitations (Rules)	Purpose
9 per team	ball bats 4 bases gloves backstop	throw catch field pitch bat tag run slide	Offense at bat Defense in field, each covering designated areas	Diamond Run bases CCW Defense pitches ball 3 strikes=out 3 outs per team each inning 7 innings Out-of-bounds rules Fly ball rule et cetera	To win To practice skills To have fun

To teach games analysis theory to students, the next procedure is to select one category in which a change is to be made. Then decide on the change and go to the playing field and try it out. As students become increasingly adept at implementing change, several components can be altered simultaneously. Illustrative of common adaptations used in adapted physical education are fewer bases, innings determined by time rather than outs, elimination of out-of-bounds areas or increasing in-bounds space, choice of balls of different sizes, weights, and colors by each batter rather than the use of one regulation ball by all players, teacher or offense pitching ball with goal of making it easy to hit

rather than defense trying to strike everyone out, and changing the nature of the pitching/batting task (e.g., rolling rather than throwing ball; substituting a stationary ball for the pitch).

Adapted physical educators have typically made these game-change decisions in order to create easier skills and rules progressions, thereby assuring success for their students. Games analysis intervention theory, as described by Morris (1976, 1980a,b) and tested in research by Marlowe (1980a) requires that students be involved in the decision-making process. Use of the games analysis model results in many values to children. Foremost of these is the development of creativity which, hopefully, will generalize to other areas of living.

Almost no research has been published on the efficacy of game changes in ameliorating psychomotor problems. Marlowe, Algozzine, Lerch, and Welch (1978) reported the success of the games analysis model in decreasing "sissy" game choices of emotionally disturbed boys whose play interests were too "feminine" for social acceptance. Marlowe (1980a) reported a second study in which the games analysis model was effective in increasing peer acceptance of socially isolated children.

Although no mention of the games analysis model was made, Martens, Rivkin, and Bump (1984) examined changes in offensive and defensive activity in children's baseball when the coach of the offensive team pitched to the batters (i.e., one rule in the regulation game was changed). They concluded that "baseball for 9- to 10-year-olds is more advantageous to the individual's development when an adult pitches to the batters, instead of the traditional method of pitching (p. 354). Clearly adapted physical education needs many more research studies like these to document its pedagogy. Among such studies should be research designs that examine the influence of game changes and/or the games analysis intervention model on the development of such creative behaviors as fluency, originality, and flexibility.

Shared Decision-Making Encourages Creativity

Schempp, Cheffers, and Zaichkowsky (1983) reported that elementary school children in a shared decision-making (SDM) class score significantly higher on creativity tests than children in a teacher decision-making (TDM) class, $F(1,172) = 4.76$, $p < .05$, and that both SDM and TDM classes score significantly higher than

a control group, $F(1,172) = 6.31$, $p < .05$. In both comparisons a significant interaction effect occurred between treatment and grade factors, $F(8,172) = 4.36$, $p < .05$. This interaction indicates that shared decision-making is more important in lower than upper grades. These findings were based on SDM and TDM groups being taught by physical education specialists one 45-minute period a week for 8 weeks. During this time two instructional units were completed, one on movement education and basic motor skills and one on tumbling and apparatus skills.

Examination of the specifics of the TDM and SDM approaches facilitates replication of this study with handicapped students. Both approaches used stations, with different tasks taught and practiced at each station. In the TDM class, all students moved from station to station at the same time whereas in the SDM class each student could move independently when he/she felt ready. In the TDM class the teacher identified the skills to be learned, demonstrated and explained them, and then supervised each child's practice, indicating to him/her when performance was successful enough for practice to cease. In contrast, students in the SDM class chose tasks to be performed, the order of practice

and/or learning, the amount of practice needed, and the criterion level of success that permitted cessation of practice. Moreover, SDM students could choose whether to ask the teacher for help or to follow a self-instructional progression on wall charts. This excellent experimental study of Schempp, Cheffers, and Zaichkowsky (1983) warrants several replications with various handicapped groups.

Specific Teaching Behaviors Affect Creativity

Several studies have been conducted which compare the teacher behaviors used with handicapped and nonhandicapped children (Rich, Wuest, & Mancini, In press). The six behaviors examined include verbal and nonverbal forms of (a) praise, encouragement, joking, (b) acceptance of student ideas, (c) question, (d) lecture or information giving, (e) directions, and (f) criticism. Mawdsley (1977) reported that teaching behaviors in adapted and regular physical education are similar except that adapted physical educators are more accepting of student ideas and exhibit more praise and encouragement than regular physical educators. Rich (1981), in a comparison of teaching behaviors in intact physical education classes of physically disabled and moderately

mentally handicapped students, reported little difference in teacher-student interactions. In general, teachers mostly gave directions which led to rote student responses which, in turn, the teacher praised and accepted. Although creativity of students was not measured directly in these studies, frequencies were recorded for the following types of student responses: (a) rote, (b) analytical, (c) initiated or unpredictable, and (d) silence, confusion. The findings were clear that teaching behaviors were facilitating rote rather than initiated reponses. Data were collected in these and other studies by the Cheffers' Adaptation of Flanders Interaction Analysis System (CAFIAS), a standardized protocol for recording behaviors every 3 seconds, with a sophisticated computer program.

Modeling and Creativity

Modeling is one of the most effective means whereby students learn behaviors, skills, attitudes, and values (Weiss, 1983). If teachers consistently exhibit creative behaviors, students are likely to become increasingly original, fluent, and flexible. Teachers not only need to be creative (e.g., silent modeling), but they must talk aloud (e.g., verbal modeling) about their thought

processes. Research is needed to examine statistically relationships between creative behaviors of teachers and handicapped children as well as between parents/siblings/ significant others and handicapped children.

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Table 1

Behaviors in the Creative Process

Behavior	Meaning
COGNITIVE/PSYCHOMOTOR	
1. Fluent Thinking/Moving To generate the most	Generation of greatest number of relevant responses
2. Flexible Thinking/Moving To take different approaches	Ability to shift categories, detours in direction of thought/movement
3. Original Thinking/Moving To think or move in novel or unique ways	Unusual and clever responses, production away from the obvious
4. Elaborative Thinking/Moving To add on to	Embellishing upon an idea or movement, embroidering upon a simple idea or response to make it more elegant, stretching or expanding upon things or ideas
AFFECTIVE	
1. Risk Taking To be challenged	Expose oneself to failure or criticisms, take a chance, function under conditions devoid of structure, defend own ideas
2. Complexity To have courage	Seek many alternatives, see gaps between how things are and how they could be, bring order out of chaos, delve into intricate problems or ideas
3. Curiosity To be willing	Be inquisitive and wonder, toy with an idea, be open to puzzling situations, ponder the mystery of things, follow a particular hunch just to see what will happen
4. Imagination To have the power	Visualize and build mental images, dream about things that have never happened, feel intuitively, reach beyond sensual or real boundaries

Note: Adapted from the Total Creativity Program by permission of the author Frank E. Williams. Reprinted from Sherrill, C. (1979). (Ed.). Creative Arts for the Severely Handicapped, p. 5.

TWU MOTOR CREATIVITY RATING SCALE

AA	A	BA	Above Average	Average	Below Average		
							Originality
10	7 5 3	1	AA	A	BA	1.	Are movement responses unusual, unexpected?
	Overall		AA	A	BA	2.	Does he/she experiment with body or body parts in new, unique, different, clever ways?
			AA	A	BA	3.	Does he/she use <u>time</u> (accents, speed, rhythm) in unusual ways?
			AA	A	BA	4.	Is <u>space</u> used in interesting, novel ways (direction, dimension, curved or direct paths, level)?
			AA	A	BA	5.	Does he/she use <u>force</u> (strong, weak, light, heavy) in unusual ways?
			AA	A	BA	6.	Does the <u>flow</u> of movement vary intentionally (easy, graceful, disharmonious, bound)?

AA	A	BA					
							Fluency
10	7 5 3	1	AA	A	BA	1.	Does he/she make lots of attempts?
	Overall		AA	A	BA	2.	Does he/she continue moving the entire time?
			AA	A	BA	3.	Do his/her movements seem quick, energetic, vivacious?
			AA	A	BA	4.	Are his/her movements relevant?
			AA	A	BA	5.	Are all objects within the environment used?

AA	A	BA					
							Flexibility
10	7 5 3	1	AA	A	BA	1.	Are attempts varied in nature, depicting rapidly changing ideas? categories?
	Overall		AA	A	BA	2.	Are time, space, force, and flow continuously changed?
			AA	A	BA	3.	Do some responses entail the entire body while others use body parts and/or objects parts, or objects in the environment?
			AA	A	BA	4.	Do approaches use different muscle groups? Different sense modalities?
			AA	A	BA	5.	Does he/she frequently change categories of movement as walk to jump to roll to clap? Locomotor to nonlocomotor and vice versa?

AA	A	BA					
							Elaboration/Imagination
10	7 5 3	1	AA	A	BA	1.	Does he/she take a simple movement or idea and add on to it in several different ways? Stretch or expand it?
	Overall		AA	A	BA	2.	Do movements reflect embellishments of several ideas?
			AA	A	BA	3.	Are objects/props used in imaginative ways? Visualized as animals, people, vehicles, etc.?
			AA	A	BA	4.	Does he/she add sound effects? Make noise? Talk? Sing? Chant?

<u>Note</u> - In scoring <u>AA</u> refers to 16% of the population, <u>A</u> to 68% of the population, and <u>BA</u> to 16% of the population in accordance with normal curve theory. In a class of 30, about 20 should be rated as average, 5 as AA, and 5 as BA. Raters should circle the 40 individual items first and then evaluate overall creativity.